Mark Scheme (Results)

Summer 2023

Pearson Edexcel GCSE
In Mathematics (1MA1)
Higher (Calculator) Paper 2H

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General marking guidance

These notes offer general guidance, but the specific notes for examiners appertaining to individual questions take precedence.

1 All candidates must receive the same treatment. Examiners must mark the lst candidate in exactly the same way as they mark the first.

Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive. When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the response should be sent to review.

2 All the marks on the mark scheme are designed to be awarded; mark schemes should be applied positively. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme. If there is a wrong answer (or no answer) indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

Questions where working is not required: In general, the correct answer should be given full marks.

Questions that specifically require working: In general, candidates who do not show working on this type of question will get no marks – full details will be given in the mark scheme for each individual question.

3 Crossed out work

This should be marked **unless** the candidate has replaced it with an alternative response.

4 Choice of method

If there is a choice of methods shown, mark the method that leads to the answer given on the answer line.

If no answer appears on the answer line, mark both methods **then award the lower number of marks.**

5 Incorrect method

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review for your Team Leader to check.

6 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working as you can check the answer, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

7 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question or its context. (eg an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (eg. incorrect algebraic simplification).

8 Probability

Probability answers must be given as a fraction, percentage or decimal. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

9 Linear equations

Unless indicated otherwise in the mark scheme, full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously identified in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

10 Range of answers

Unless otherwise stated, when an answer is given as a range (eg 3.5 – 4.2) then this is inclusive of the end points (eg 3.5, 4.2) and all numbers within the range

11 Number in brackets after a calculation

Where there is a number in brackets after a calculation eg 2 × 6 (=12) then the mark can be awarded **either** for the correct method, implied by the calculation **or** for the correct answer to the calculation.

12 Use of inverted commas

Some numbers in the mark scheme will appear inside inverted commas eg "12" × 50 ; the number in inverted commas cannot be any number – it must come from a correct method or process but the candidate may make an arithmetic error in their working.

13 Word in square brackets

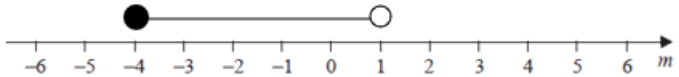
Where a word is used in square brackets eg [area] × 1.5 : the value used for [area] does **not** have to come from a correct method or process but is the value that the candidate believes is the area. If there are any constraints on the value that can be used, details will be given in the mark scheme.

14 Misread

If a candidate misreads a number from the question. eg uses 252 instead of 255; method or process marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review.

Guidance on the use of abbreviations within this mark scheme	
M	method mark awarded for a correct method or partial method
P	process mark awarded for a correct process as part of a problem solving question
A	accuracy mark (awarded after a correct method or process; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
C	communication mark awarded for a fully correct statement(s) with no contradiction or ambiguity
B	unconditional accuracy mark (no method needed)
oe	or equivalent
cao	correct answer only
ft	follow through (when appropriate as per mark scheme)
sc	special case
dep	dependent (on a previous mark)
indep	independent
awrt	answer which rounds to
isw	ignore subsequent working

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1 (a)	1.765(2...)	M1	for fully evaluating the numerator or denominator, eg 18.3... or 10.4(1) **or** answer of 1.76 or 1.77 **or** digits 1765(2...)	
		A1	for 1.765(2.....)	Answer must be given to at least 3 decimal places rounded or truncated. Check first 4 significant figures only.
(b)	1.6	B1	for 1.6 oe	
2	$2 \times 2 \times 3 \times 5$	M1	for a complete method to find prime factors, could be shown on a complete factor tree, with no more than one error or by division by prime factors with no more than one error **or** for 2, 2, 3, 5 (1)	Condone the inclusion of 1 for the method mark
		A1	for $2 \times 2 \times 3 \times 5$ oe	Accept $2^2 \times 3 \times 5$
3	No with reason	C1	for No and valid reason, eg compares $\frac{1}{3}$ with $\frac{1}{2}$ or 16 (with 24) **Acceptable examples** No, $\frac{1}{3}$ are red not $\frac{1}{2}$ There are 16 red counters (not 24) No as she has used the ratio 1:1 (not 1:2) Incorrect as it is 16 : 32 No as she should divide by 3 (as 1 + 2 = 3) No as they would both be 24 so it doesn't fit in the ratio 1 : 2 No because 24 + 48 = 72 **Not acceptable examples** Yes, … No as the number of red counters would be lower There is 1 red for every 2 blue	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
4 (a)	4	B1	cao	
(b)	correct diagram	C2	for a fully correct diagram, eg 	
		(C1	for drawing a line from –4 to 1 **or** (indep) for an open circle at 1 **or** (indep) for an closed circle at –4)	Condone arrow heads or line ending to denote the 'end' of the line
(c)	$g < 25$	M1	for a correct first step, eg adding 4 to both sides, eg $\frac{2}{5}g < 6 + 4$ **or** multiplying throughout by 5, eg $2g - 4 \times 5 < 6 \times 5$ **or** dividing throughout by 2, eg $\frac{1}{5}g - 4 \div 2 < 6 \div 2$	Allow use of any inequality or as an equation for both method marks $\frac{2}{5}g < 10$ $2g - 20 < 30$ $\frac{g}{5} - 2 < 3$
		M1	for a correct second step, eg $2g <$ "10" $\times 5$ or $\frac{1}{5}g <$ "10" $\div 2$ **or** $2g <$ "30" + "20" or $g -$ "20" $\div 2 <$ "30" $\div 2$ **or** $\frac{g}{5} <$ "3" + "2" or $g -$ "2" $\times 5 <$ "3" $\times 5$ **or** showing 25 oe as the critical value	$2g < 50$ $\frac{g}{5} < 5$ $g - 10 < 15$ Can be written as $g = 25$
		A1	for $g < 25$ oe	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
5	1.25	P1	for finding an expression for the area of one shape, eg $\frac{1}{2} \times 8 \times 6x$ (= $24x$) or $5(4x - 1)$ (= $20x - 5$) oe	Condone missing brackets for area of rectangle for all process marks
		P1	for finding an expression for the area of both shapes, eg $\frac{1}{2} \times 8 \times 6x$ **and** $5(4x - 1)$ oe **or** [area of triangle] – 10 or [area of rectangle] + 10 oe or [area of triangle] – [area of rectangle]	
		P1	for writing a correct equation, eg $\frac{1}{2} \times 8 \times 6x = 5(4x - 1) + 10$ oe **or** (dep on 1st P1) eg, [area of triangle] – 10 = [area of rectangle] or [area of triangle] = [area of rectangle] + 10 or [area of triangle] – [area of rectangle] = 10	
		A1	for 1.25 oe	
6	168	P1	for a start to the process, eg $\frac{57}{100} \times 800$ (= 456) or $57 \div (12 + 7)$ (= 3) or $800 \div (12 + 7)$ (= 42.1...) **or** [amount] $\times \frac{57}{100}$ or [amount] $\times \frac{7}{12 + 7}$	May be seen as part of other calculations, eg $\frac{7}{12 + 7} \times 57$ (= 21) or $\frac{7}{12 + 7} \times 800$ (= 294.7...) [amount] can be any figure considered as being 57% of 800 or 43% of 800 calculated incorrectly or a figure calculated using a full or partial ratio incorrectly as a first step
		P1	for a complete process to find the weight of glass, eg $\frac{57}{100} \times 800 \times \frac{7}{12 + 7}$ oe	
		A1	for an answer in the range 167.9 to 168 SCB2 for an answer of 288	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
7	12.65, 12.75	B1	for 12.65 in correct position	
		B1	for 12.75 in correct position	Accept 12.74$\dot{9}$ or 12.7499(…)
8	Rachel supported	P1	for process to begin to work with percentage for year 1 for Tamsin or Rachel, eg 150000 × 0.04 (= 6000) oe or 150000 × 1.04 (= 156000) oe **or** 160000 × 0.015 (= 2400) oe or 160000 × 1.015 (= 162400) oe	May be implied by 12000 or 4800 or 162000 or 164800
		P1	for process to use compound interest for Tamsin or Rachel, eg "156000" × 0.04 (= 6240) oe or "156000" × 1.04 (= 162240) oe **or** "162400" × 0.015 (= 2436) oe or "162400" × 1.015 (= 164836) oe or 1.04^2 (= 1.0816) or 1.015^2 (= 1.030225) **OR** for process to begin to work with percentage increase for Tamsin **and** Rachel for one year, eg 150000 × 1.04 (= 156000) oe **and** 160000 × 1.015 (= 162400) oe	values may be rounded or truncated to 3 sf May be implied by 162000 **and** 164800
		P1	for full process to find figures to compare, eg Tamsin for 2 years **and** Rachel for 2 years eg 150000 × 1.04^2 (= 162240) oe **and** 160000 × 1.015^2 (= 164836) oe **OR** Tamsin for 2 years **and** Rachel for 1 year eg 150000 × 1.04^2 (= 162240) oe **and** 160000 × 1.015 (= 162400) oe	Other comparisons are possible
		C1	for Rachel with supporting figures, eg 162240 **and** 164836 **or** 162240 **and** 162400 **or** other valid conclusion with supporting comparable figures	Note that the figure used to compare for Rachel can be the figure after 2 years or after 1 year

Paper: 1MA1/2H					
Question		**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
9	(a)	Graph drawn through (30, 20), (40, 48), (50, 64), (60, 75), (70, 80)	M1	for 4 or 5 points plotted correctly from the cumulative frequency table	Ignore to the left of the first point and right of the last point If histograms drawn, points must be identified
			A1	for a fully correct graph SCB1 if 4 or 5 points plotted not at end but consistent within each interval and joined by a curve or line segments providing no gradient is negative	Accept a smooth curve or line segments
	(b)	36 to 38	B1	for answer in range 36 to 38 or ft their cf graph	
10	(a)	$\frac{225}{3600}$	P1	for process to use relative frequency for landing on a 6, eg $\frac{15}{60}$ oe	
			P1	for $\frac{15}{60}\times\frac{15}{60}$ oe, eg $\frac{1}{4}\times\frac{1}{4}$	
			A1	for $\frac{225}{3600}$ oe, eg $\frac{1}{16}$	Accept any equivalent fraction, decimal form 0.06(25) or 0.062 or 0.063, percentage form 6(.25)% or 6.2% or 6.3% Ignore subsequent attempts to write the correct answer in a different form.
	(b)	Explanation	C1	for a correct explanation **Acceptable examples** *n* must be greater than 60 She must do it more times than in (a) *n* must be bigger, eg 100 **Not acceptable examples** If you increase the number of results, you increase the accuracy *n* must be bigger *n* is an integer *n* is 100	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
11	$x = -2$, $y = 1.5$	M1	for a correct process to eliminate one variable (condone one arithmetic error)	
		A1	for either $x = -2$ or $y = 1.5$ oe	Fractions do not need to be in simplest form
		M1	(dep M1) for substituting found value in one of the equations **or** correct process after starting again (condone one arithmetic error)	
		A1	for $x = -2$, $y = 1.5$ oe SCB2 for both correct answers if no more than 1 mark awarded SCB1 for one correct answer if no marks awarded	Fractions do not need to be in simplest form
12	40.2	P1	for start of process to find the diameter or the radius of the circle, eg $8^2 + 10^2 (= d^2)$ oe or $4^2 + 5^2 (= r^2)$ oe	
		P1	for complete process to find diameter, eg $\sqrt{8^2 + 10^2}$ (= 12.8...) or complete process to find radius, eg $\sqrt{4^2 + 5^2}$ (= 6.40...)	Accept $\sqrt{164}$ or $2\sqrt{41}$ or $\sqrt{41}$
		P1	for process to find circumference, eg $\pi \times$ "12.8..." or $2 \times \pi \times$ " 6.40..."	
		A1	answer in the range 40.2 to 40.24	If an answer is given in the range in working and then rounded incorrectly award full marks.

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
13	58.5	P1	for start of process to find angle *BCA*, eg $\frac{18}{\sin 70} = \frac{15}{\sin BCA}$ or $\frac{\sin 70}{18} = \frac{\sin BCA}{15}$	Angle *BCA* must be correctly identified to gain marks $\sin 70 = 0.939\ldots$ $\sin 70 \div 18 = 0.052\ldots$ $18 \div \sin 70 = 19.1\ldots$
		P1	for rearrangement, eg $(\sin BCA =)\frac{15\sin 70}{18}$ (= 0.783…) oe **or** *BCA* = 51.5...	
		P1	for complete process to find angle *BAC*, eg $180 - 70 - \sin^{-1}\left(\frac{15\sin 70}{18}\right)$	
		A1	for answer in the range 58.4 to 58.5	If an answer is given in the range in working and then rounded incorrectly award full marks.
14	$\frac{x + 2}{2x + 1}$	M1	for correctly factorising one expression, eg $(x - 3)(x + 2)$ or $(x - 3)(2x + 1)$	
		M1	for factorising both expressions, eg $(x - 3)(x + 2)$ and $(x - 3)(2x + 1)$	
		A1	oe or $a = 1$, $b = 2$, $c = 2$, $d = 1$	eg $\frac{2 + x}{1 + 2x}$, $\frac{-x - 2}{-2x - 1}$

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
15	$n^2 + 3n - 1$	M1	for a correct start to a method to find the *n*th term, eg constant 2nd differences and n^2 **OR** states $2a = 2$ **or** $3a + b = 6$	Need to see constant second difference found and n^2 Condone use of different variable throughout $a = 1$ **or** $b = 3$ implies M1
		M1	for working with n^2, eg n^2 and sequence 2, 5, 8, … **OR** states $2a = 2$ **and** $3a + b = 6$	$n^2 + 3n$ implies M2 $a = 1$ **and** $b = 3$ implies M2
		A1	for $n^2 + 3n - 1$	
16 (a)	Bar of height 2.4 cm (fd = 1.2) drawn for interval 40 – 60 hours	M1	for using area to represent frequency, eg 11.2 (cm²) represents 28 (students) or for showing correct scale on fd axis, 2 cm = 1 unit or correct process to find the height of bar, eg $\frac{28}{10}$ $(= 2.8)$ or $\frac{24}{20}$ $(= 1.2)$	May use any unit of area. Can be implied by frequency of 32 or 36.
		A1	cao	Can ignore scale if bar is correct
(b)	120	M1	ft their histogram for method to find total frequency, eg $(1.6 \times 20) + (3.6 \times 10) + 28 + 24$ oe **or** for method to find total area under the histogram, eg $(4 \times 3.2) + (2 \times 7.2) + (2 \times 5.6) + (4 \times 2.4)$ (= 48) oe	Condone 1 error in reading fd values or measurements.
		A1	for 120 ft	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
17 (a)	Shows re-arrangement	C1	for showing rearrangement, must see $x^4 = x^2 + 5$ leading to $x = \sqrt[4]{x^2 + 5}$	Can work backwards
(b)	1.669763088	M1	for substitution to find x_1 eg $\sqrt[4]{1.5^2 + 5}$ (= 1.64...)	
		M1	for substitution to find x_2 eg $\sqrt[4]{"1.64\ldots"^2 + 5}$ (= 1.66...)	
		A1	for answer in the range 1.6697 to 1.6698 or 1.67(0)	If a correct value is given and then rounded or rounded incorrectly award full marks
18	Shown	M1	for start to method to find a ratio connecting 2 of a, b and c, eg $a : c = 3 : 5$ oe or $b : c = 5 : 3$ oe **or** for start to method to combine ratios, eg $14a : 35c$ (= 126 : 525) **and** $20b : 35c$ (= 500 : 525)	May be expressed in fractional form Any ratios must be clearly assigned to variables
		M1	for method to find $a : b : c$, eg 9 : 25 :15 oe **or** for method to write $a + b : b + c$ in terms of one variable eg $\frac{3c}{5} + \frac{5c}{3} : \frac{5c}{3} + c$	
		A1	for $a + b : b + c = 34 : 40$ oe leading to result	34: 40 may be seen as $9 + 25 : 25 + 15$
19	46.989...	B1	for stating at least one bound, 9.25 or 9.35 or 12.55 or 12.65	Accept $9.34\dot{9}$ or 9.3499(…) or $12.64\dot{9}$ or 12.6499(…)
		P1	for correct use of LB and UB, eg $\sin x = \frac{[\text{LB of } AB]}{[\text{UB of } AC]}$	$9.25 \leq \text{LB} < 9.3$ $12.6 < \text{UB} \leq 12.65$ $\sin(x) = 0.731(\ldots)$
		A1	for answer in the range 46.98 to 47 from correct working	Answer only award no marks.

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20	$\frac{3}{5}\mathbf{a}+\frac{2}{5}\mathbf{b}$	P1	for process to find $\overrightarrow{OR}=\mathbf{a}-\mathbf{b}$ or $\overrightarrow{RO}=\mathbf{b}-\mathbf{a}$	
		P1	for process to find $\overrightarrow{MR}=\frac{3}{5}(\mathbf{a}-\mathbf{b})$ or $\overrightarrow{MO}=\frac{2}{5}(\mathbf{b}-\mathbf{a})$ or $\overrightarrow{RM}=\frac{3}{5}(\mathbf{b}-\mathbf{a})$ or $\overrightarrow{OM}=\frac{2}{5}(\mathbf{a}-\mathbf{b})$	
		P1	for complete process to find $\overrightarrow{MT}$ in terms of **a** and **b,** eg $\frac{3}{5}(\mathbf{a}-\mathbf{b})+\mathbf{b}$ oe or $\frac{2}{5}(\mathbf{b}-\mathbf{a})+\mathbf{a}$ oe	
		A1	for $\frac{3}{5}\mathbf{a}+\frac{2}{5}\mathbf{b}$ or $\frac{1}{5}(3\mathbf{a}+2\mathbf{b})$ or $\frac{3\mathbf{a}+2\mathbf{b}}{5}$	Accept decimals instead of fractions
21 (a)	Sketch graph	B1	cao	Allow freehand sketch provided intention is clear. (–3, –4), (–2, –3), (–1, –3), (0, –4)
(b)	Sketch graph	B1	cao	Allow freehand sketch provided intention is clear. (0, 0), (1, 1), (2, 1), (3, 0)

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
22	$1-\left(\frac{4}{5}\right)^n-\left(\frac{1}{5}\right)^n$	P1	for start to the process, eg P(at least one blue and at least one red) = 1 – P(all blue) – P(all red) oe **or** P(all blue) = $\left(\frac{4}{5}\right)^n$ oe **or** P(all red) = $\left(\frac{1}{5}\right)^n$	
		A1	for $1-\left(\frac{4}{5}\right)^n-\left(\frac{1}{5}\right)^n$ oe	
23	Shown	M1	for start to process using ratio, eg 1 : 1 + 2 : 1 + 2 + 3 (= 1 : 3 : 6)	Values may not be seen in a ratio, can still award M marks May be seen combined with algebra
		M1	for process to write down ratio of areas of triangles eg $1^2 : 3^2 : 6^2$ (= 1 : 9 : 36)	
		C1	for correct working leading to answer, eg 1 : 9 – 1 : 36 – 9 = 1 : 8 : 27	

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
24	$4\left(2+\sqrt{2}\right)a^2$	P1	for process to find area required and identifying 135° or 45° or 90° angle(s), eg splitting shape into square and 4 triangles and an angle relevant to the triangle clearly identified.	90° must be in a triangle to gain credit. May be seen on diagram.
		P1	for process to find the area of a relevant triangle using 45°, eg $\frac{1}{2}\times a\times\left(2\times\frac{a}{\sqrt{2}}\right)\times\frac{1}{\sqrt{2}}\left(=\frac{a^2}{2}\right)$ or using 90°, eg $\frac{1}{2}\times a\times a\ \left(=\frac{a^2}{2}\right)$ or process to find the area of a square made from 2 small triangles, eg $a\times a\ (=a^2)$	Accept $0.49...a^2$ May be seen as the area of 2 squares (from 4 small triangles)
		P1	for process to find the length of the square, eg $a+a+\sqrt{a^2+a^2}\ (=2a+a\sqrt{2})$	Accept $3.41a$
		P1	for process to find the total area, eg $(\text{"}2a+a\sqrt{2}\text{"})^2+4\times\text{"}\frac{a^2}{2}\text{"}$	Accept $(11.655+4\times0.49)\,a^2$
		A1	(dep on P3) for $4\left(2+\sqrt{2}\right)a^2$	Answer only award no marks. If working in decimals accept $\frac{13.656}{2+\sqrt{2}}$ leading to 4 Accept $p = 4$ if supported by correct working

Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 2H

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme. Notes apply to both MLP papers and Braille papers unless otherwise stated.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5º
Measurements of length: ±5 mm

		Modification	**Mark scheme notes**
4	(b)	Wording added ‘Look at the diagram for Question 4(b) in the Diagram Booklet. It shows a number line’. Wording removed ‘below’. Diagram enlarged. Open headed arrow. Axis label moved to the right of the horizontal axis.	Standard mark scheme
4	(c)	Letter ‘*g*’ changed to ‘*t*’.	Standard mark scheme but note letter change.
5		Wording added ‘Look at the diagram for Question 5 in the Diagram Booklet. It shows a triangle ABC and a rectangle PQRS.’ Wording removed ‘Here is a triangle and a rectangle.’ Triangle labelled ABC. Rectangle labelled PQRS. Diagram enlarged. Diagrams stacked vertically. Right angle made more obvious. Shape labels moved to the left and to above the rectangle. Wording added ‘In triangle ABC: AB is marked 6*x*; BC is marked 8; Angle ABC is a right angle. In rectangle PQRS: PQ is marked 5; PS is marked 4*x* – 1’	Standard mark scheme
7		Letter ‘*d*’ changed to ‘*n*’.	Standard mark scheme but note letter change.
9		Wording added ‘Look at the diagram for Question 9 in the Diagram Booklet. It shows a grid.’ Wording added ‘below’ Table enlarged and left aligned. Letter ‘*a*’ changed to ‘A’. Values changed in the table: 48 changed to 50; 64 changed to 65 Wording removed ‘opposite’ and replaced with ‘in the Diagram Booklet.’ Grid enlarged. No small squares. Black grid lines added. Open headed arrows. Right axis labelled. Axes labels moved to the top of the vertical axis and to the left of the horizontal axis	(a) Standard mark scheme using the amended numbers n in the table. (b) B1 for answer in the range 32.5 to 38.5 or ft their cf graph with a tolerance of ±2.5 (5 mm)
10		Wording added ‘Look at the table for Question 10 in the Diagram Booklet.’ Table enlarged and turned vertical.	Standard mark scheme
12		Wording added ‘Look at the diagram for Question 12 in the Diagram Booklet. It shows the’. Wording removed ‘The’; Wording removed ‘lie’; Wording added ‘the circumference of’. Diagram enlarged. Cross changed to a solid dot. Wording ‘BC’ removed and replaced with ‘AD’. Labels moved to the left of the rectangle and inside the rectangle.	Standard mark scheme

		Modification	**Mark scheme notes**
13		Wording added ‘Look at the diagram for Question 13 in the Diagram Booklet. It shows triangle ABC.’; Wording removed ‘ABC is a triangle.’ Diagram enlarged and rotated so AC is horizontal. Angle moved outside angle arc and angle arc made smaller. Wording added ‘AB = 15 cm; AC = 18 cm; Angle ABC = 70°’	Standard mark scheme
16		Wording added ‘Look at the diagram for Question 16 in the Diagram Booklet. It shows an incomplete histogram.’ Diagram enlarged. Small squares removed. Bar heights changed: 0-20 is now 3 cm high, 20-30 is now 7 cm high, 30-40 is now 6 cm high. Open headed arrows. Shading changed. Right axis labelled. Axes labels moved to the top of the vertical axis and to the left of the horizontal axis. Value 28 changed to 30 and value 24 changed to 20. (a) Wording added ‘in the Diagram Booklet’.	(a) M1 for using area to represent frequency eg 12 (cm^2) represents 30 (students) or showing a correct scale on fd axis A1 Bar of height 2 cm drawn for interval 40 – 60 hours (b) M1 for method to find total area under the histogram, eg (4 × 3) + (2 × 7) + (2 × 6) + (4 × 2) (= 46) oe **or** for method to find total frequency, eg 30 + 35 + 30 + 20 oe A1 for 115 cao
18		Letter ‘*a*’ changed to ‘*p*’; Letter ‘*b*’ changed to ‘*q*’; Letter ‘*c*’ changed to ‘*r*’.	Standard mark scheme but note change of letters.
19		Wording added ‘Look at the diagram for Question 19 in the Diagram Booklet. It shows a right-angled triangle ABC.’ Wording removed ‘ABC is a right-angled triangle.’ Diagram enlarged. Right angle made more obvious. Angle label moved outside angle arc and angle arc made smaller. Wording added ‘Angle ABC is a right angle. Angle ACB is marked *x*.’	Standard mark scheme

		Modification	Mark scheme notes
20		Wording added ‘Look at the diagram for Question 20 in the Diagram Booklet. It shows a triangle ORT.’ Wording removed ‘ORT is a triangle.’ Diagram enlarged. Open headed arrows. Arrow heads enlarged. Line at M changed to a solid circle. Dashed line added for MT.	Standard mark scheme
21	(a)	Wording removed ‘Here is the graph of $y = f(x)$’. Diagram removed. Wording added ‘Look at the diagram for Question 21(a) in the Diagram Booklet. It shows the graph of $y = f(x)$’ Wording ‘grid below’ removed and replaced with ‘diagram’. Axes labels moved to the top of the vertical axis and to the right of the horizontal axis. Grid enlarged. $y = f(x)$ graph line added.	Standard mark scheme
21	(b)	Wording added ‘Look at the diagram for Question 21(b) in the Diagram Booklet. It shows the graph of $y = f(x)$’ Wording ‘grid below’ removed and replaced with ‘diagram’. Axes labels moved to the top of the vertical axis and to the right of the horizontal axis. Grid enlarged. $y = f(x)$ graph line added.	Standard mark scheme
23		Wording added ‘Look at the diagram for Question 23 in the Diagram Booklet. It shows’. Wording removed ‘Here are’. Diagram enlarged. Arrow heads enlarged.	Standard mark scheme
24		Wording added ‘Look at the diagram for Question 24 in the Diagram Booklet. It’. Wording removed ‘The diagram’. Diagram enlarged. Shading changed. Letter ‘a’ changed to ‘t’.	Standard mark scheme but note change of letters.

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